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Providing Power When There is None

Instant Access Networks, Frostburg Faculty Developing Renewable-Energy-Fueled Power Grids Safe From Electromagnetic Pulse Attacks

Chuck Manto, president of Instant Access Networks, and Robin Frazier, vice president of Instant Access Networks. Full-resolution photo.

A pickup truck pulling an EMP-protected mobile command center with Chuck Manto, president of Instant Access Networks, and Robin Frazier, vice president of Instant Access Networks.

COLLEGE PARK, Md.--Imagine if electronic devices in the U.S. were disabled. Your car would not run. You couldn't make a phone call. Television, radio, GPS, computers and their related financial and military systems could be down. Power could be out for as long as two years.

Sound far-fetched? A one-megaton nuclear bomb detonated 250 miles over Kansas could cripple many modern electronic devices and systems in the continental U.S. and take out the power grid for a long time.

"A rogue state or terrorist organization could easily acquire nuclear material for a smaller weapon for $20 million," says Charles Manto, president of Instant Access Networks LLC (IAN). "That weapon could be fitted onto a Scud missile for as little as $100,000, fired and detonated 80 miles into the air and affect the entire U.S. east

coast, causing up to $10 trillion in damage before you spend a nickel to fix anything."

A solar storm similar to the one that occurred in 1859, which shorted out telegraph wires in the United States and Europe, could wreak havoc on electrical systems. Each of the above scenarios can create a powerful electromagnetic pulse that overloads electronic devices and systems.

IAN staff and Frostburg State University physics and engineering professor Hilkat Soysal are teaming—through a $165,000 project recently approved by the Maryland Industrial Partnerships (MIPS) program—to create renewable energy-powered, electromagnetic pulse (EMP)-protected microgrids that could provide electricity for critical infrastructure facilities in the event of a disaster.

"The MIPS award enhances our commitment to renewable energy research," says Frostburg State University President Jonathan C. Gibralter. "It builds upon the $738,000 Sustainable Energy Research Facility (SERF) award we just received from the Department of Energy and illustrates our interest in supporting workforce and economic development in western Maryland."

IAN has developed a patent-pending shielding technology that encloses a room or similar structure and protects it from EMP events. IAN's shielding, which includes electrically isolated layers of steel and aluminum, is up to 70 percent lighter than materials traditionally used by the military and other sources for EMP protection. This enables EMP-safe rooms to be portable.

IAN's shielded rooms can protect mission-critical fiber optic network nodes and data or communication centers. They can also house generators, which, when several are connected, create a micro power grid, or microgrid, that can provide power to a campus or entire communities.

"A microgrid could easily power the city of Annapolis, a hospital, or the University of Maryland campus," says Manto. "The idea is to create islands of power to reduce the cascading

Full-resolution photo.

effects of a wide-scale failure."

The challenge is finding a long-term energy source for microgrids, as it could take years to rebuild power infrastructure after a strong EMP event. That is where the MIPS project comes in.

Soysal's research team will evaluate wind and solar solutions and the optimal locations for them in western Maryland and the surrounding region. "FSU physics and engineering faculty Oguz Soysal and Eric Moore will guide a group of students to evaluate the energy consumption profile of mission-critical facilities and infrastructures, identify the wind and solar energy potential of possible sites, and develop an optimal design for the sustainable energy supply units and microgrid," says Hilkat Soysal. FSU senior research fellow David Blank will provide prototype computer simulations for a next-generation multi-flex fuel generator that is 40 percent more efficient than traditional engines. The FSU team and IAN staff together will investigate additional renewable energy subsystems that the company can integrate into the EMP-protected microgrid.

"Long-term, renewable energy is critical for powering back-up electrical systems," says Manto. "What's more, in EMP scenarios the cost model for renewable energy changes because you have to eliminate the cheap, non-renewable fuels and the availability of the present electric grid. Renewable energy, even at a higher price, becomes cost-justified. We are effectively jump-starting alternative energy development."

FSU is acquiring a residential-scale wind turbine for the project, which will be used to develop models for powering the microgrid. University researchers and IAN staff will also create designs to protect a wind turbine from an EMP attack.

FSU and IAN are also planning to build the nation's first EMP-protected business continuity park. It will be located next to the FSU Renewable Energy Center at the university and include input from the Public Technology Institute (PTI). The park will give urban area businesses and government agencies a remote place to backup their data and an alternative

place to work in the wake of a disaster, in keeping with a Continuity of Operations Plan (COOP). Federal Agencies are required to have COOPs as part of Federal Preparedness Circular 65. Businesses and other entities are recommended to do the same through the National Fire Protection Agency's code 1600 for business continuity. PTI plans to review the EMP-protected business continuity concept among local governments nationwide.

"Assisting local governments in creating COOP plans that protect them from natural and human-caused disasters requires innovation and support from a variety of entities," says PTI Executive Director Alan Shark. "We are excited to be part of this team working on this groundbreaking project."

Based in Frostburg, IAN was founded in 2004 through $1 million in seed money from IAN staff and private investors. The company received a $70,000 TEDCO Maryland Technology Transfer Fund grant in July, 2007 to develop prototypes of lightweight shielding systems that can be mass-produced and offer critical infrastructure protection from electromagnetic interference.

For photos of IAN staff and mobile EMP-protected rooms, visit http://www.mtech.umd.edu/IAN. More information about renewable energy related activities at FSU can be found at http://www.frostburg.edu/renewable/.

More information

- Instant Access Networks: http://stop-emp.com
- Initial Economic Assessment of Electromagnetic Pulse (EMP) Impact upon the Baltimore-Washington-Richmond Region by The Sage Policy Group: http://stop-emp.com/econimpact.pdf
- CRS Report for Congress: High Altitude Electromagnetic Pulse (HEMP) and High Power Microwave (HPM) Devices: Threat Assessments: http://stop-emp.com/crs.pdf
- Report of the Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack:

http://stop-emp.com/EMPCExecRpt_Final072204.pdf

- Frostburg State University: www.frostburg.edu

About MIPS (www.mips.umd.edu)
The Maryland Industrial Partnerships Program, an initiative of the A. James Clark School of Engineering's Maryland Technology Enterprise Institute (Mtech), brings university innovation to the commercial sector by supporting university-based research projects to help Maryland companies develop technology-based products. Through MIPS, faculty members engage in research that furthers the development of high-tech products for Maryland companies. Projects must be technology-focused and possess commercial potential. Both the company and the University of Maryland contribute funding for each project. All funding goes to the participating faculty.

ABOUT PTI (www.pti.org)
Public Technology Institute is a national, member-supported organization based in Washington, D.C. As the only technology organization created by and for cities and counties, PTI works with a core network of leading local government officials - the PTI membership - to identify opportunities for research, share best practices, offer consultancies and pilot demonstrations, promote technology development initiatives and present educational programming.

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